

determination of equivalency to required sea service. Simulator training cannot be substituted for recency requirements, but may substitute for a maximum of 25 percent of the required service for any license transaction.

(e) Except as provided in § 10.202, when a candidate both applies for an STCW certificate or endorsement as an officer in charge of a navigational watch, on the basis of training or sea service commencing on or after August 1, 1998, and uses completion of approved training to substitute for required service, then not less than 1 year of the remaining service must be part of approved training that meets the appropriate requirements of Chapter II of STCW and the requirements of subpart C of this part. The training of a candidate must be documented in a Coast Guard-accepted training-record book.

(f) Except as provided in § 10.202, each candidate who applies for an STCW certificate or endorsement as an officer in charge of an engineering watch or as a designated duty engineer on the basis of training or sea service commencing on or after August 1, 1998, for service on seagoing vessels, shall complete on-board training as part of approved training that meets the appropriate requirements of Chapter III of STCW and the requirements of subpart C of this part. The training must be documented in a Coast Guard-accepted training-record book.

(g) The training-record book referred to in paragraphs (e) and (f) of this section must contain at least the following:

- (1) The identity of the candidate.
- (2) The tasks to be performed or the skills to be demonstrated, with reference to the standards of competence set forth in the tables of the appropriate sections in part A of the STCW Code.
- (3) The criteria to be used in determining that the tasks or skills have been performed properly, again with reference to the standards of competence set forth in the tables of the appropriate sections in part A of the STCW Code.

(4) A place for a qualified instructor to indicate by his or her initials that the candidate has received training in

the proper performance of the task or skill.

(5) A place for a designated examiner to indicate by his or her initials that the candidate has successfully completed a practical demonstration and has proved competent in the task or skill under the criteria, when assessment of competence is to be documented in the record books.

(6) The identity of each qualified instructor, including any Coast Guard license or document held, and the instructor's signature.

(7) The identity of each designated examiner, when any assessment of competence is recorded, including any Coast Guard license or document held, and the examiner's signature confirming that his or her initials certify that he or she has witnessed the practical demonstration of a particular task or skill by the candidate.

(h) The training-record book referred to in paragraphs (e) and (f) of this section may be maintained electronically, if the electronic record meets Coast Guard-accepted standards for accuracy, integrity, and availability.

[CGD 81-059, 52 FR 38623, Oct. 16, 1987, as amended by CGD 81-059, 54 FR 135, Jan. 4, 1989; CGD 95-072, 60 FR 50460, Sept. 29, 1995; CGD 95-062, 62 FR 34531, June 26, 1997; USCG-1998-4442, 63 FR 52189, Sept. 30, 1998]

§ 10.305 Radar-Observer certificates and qualifying courses.

(a) A student who takes an approved course of training, which includes passing both a radar-theory examination and a practical demonstration on a simulator, and who meets the requirements of this section is entitled to an appropriate Radar-Observer certificate—

- (1) In a form prescribed by the school and acceptable to the Coast Guard; and
- (2) Signed by the head of the school.

(b) The following Radar-Observer certificates are issued under this section:

- (1) Radar Observer (Unlimited).
- (2) Radar Observer (Inland Waters and Gulf-Intracoastal Waterway [GIWW]).
- (3) Radar Observer (Rivers).
- (4) Radar Observer (Unlimited: Renewal).
- (5) Radar Observer (Inland Waters and GIWW: Renewal).

(6) Radar Observer (Rivers: Renewal).

(c) A school with an approved Radar-Observer course may issue a certificate listed in paragraph (b) of this section after the student has successfully completed the appropriate curriculum as follows:

(1) Radar Observer (Unlimited). Classroom instruction—including demonstration and practical exercises using simulators—and examination, in the following subjects:

(i) Fundamentals of radar:

(A) How radar works.

(B) Factors affecting the performance and accuracy of marine radar.

(C) Purposes and functions of the main components that constitute a typical marine-radar system.

(ii) Operation and use of radar:

(A) Purpose and adjustment of controls.

(B) Detection of malfunctions, false and indirect echoes, and other radar phenomena.

(C) Effects of sea return, weather, and other environmental conditions.

(D) Limitations of radar resulting from design factors.

(E) Safety precautions associated with use and maintenance of marine radar.

(F) Measurement of ranges and bearings.

(G) Effect of size, shape, composition, and distance of vessels and terrestrial targets on echo.

(iii) Interpretation and analysis of radar information:

(A) Radar navigation (including visual techniques)—determining positions, and detecting changes in the relative motion, of other vessels.

(B) Collision-avoidance, including visual techniques, appropriate to the circumstances and the equipment in use.

(C) Determining the course and speed of another vessel.

(D) Determining the time and distance of closest point of approach of a crossing, meeting, overtaking, or overtaken vessel.

(E) Detecting changes of course or speed of another vessel after its initial course and speed have been established.

(F) Applying the Navigational Rules, Chapters 30 and 34 of Title 33 U.S. Code [Commandant Instruction M16672.2C, as

amended, or equivalent], and other factors to consider when determining changes of course or speed of a vessel to prevent collisions on the basis of radar observation.

(G) Use of radar in maintaining situational awareness.

(iv) Plotting (by any graphically-correct method):

(A) Principles and methods of plotting relative and true motion.

(B) Practical-plotting problems.

(2) Radar Observer (Inland Waters and GIWW). Classroom instruction—with emphasis on situations and problems encountered on inland waters and the GIWW, including demonstration and practical exercises using simulators—and examination, in the following subjects:

(i) Fundamentals of radar:

(A) How radar works.

(B) Factors affecting the performance and accuracy of marine radar.

(C) Purpose and functions of the main components that constitute a typical marine-radar system.

(ii) Operation and use of radar:

(A) Purpose and adjustment of controls.

(B) Detection of malfunctions, false and indirect echoes, and other radar phenomena.

(C) Effects of sea return, weather, and other environmental conditions.

(D) Limitations of radar resulting from design factors.

(E) Safety precautions associated with use and maintenance of marine radar.

(F) Measurement of ranges and bearings.

(G) Effect of size, shape, composition, and distance of vessels and terrestrial targets on echo.

(iii) Interpretation and analysis of radar information:

(A) Radar navigation (including visual techniques)—determining positions, and detecting changes in the relative motion, of other vessels.

(B) Collision-avoidance, including visual techniques, appropriate to the circumstances and the equipment in use.

(C) Determining the course and speed of another vessel.

(D) Determining the time and distance of closest point of approach of a

crossing, meeting, overtaking, or overtaken vessel.

(E) Detecting changes of course or speed of another vessel after its initial course and speed have been established.

(F) Applying the Navigational Rules, and other factors to consider when determining changes of course or speed of a vessel to prevent collisions on the basis of radar observation.

(G) Use of radar in maintaining situational awareness.

(3) Radar Observer (Rivers). Classroom instruction—with emphasis on situations and problems encountered on rivers, including demonstration and practical exercises using simulators—and examination, in the following subjects:

(i) Fundamentals of radar:

(A) How radar works.

(B) Factors affecting the performance and accuracy of marine radar.

(C) Purpose and functions of the main components that constitute a typical marine-radar system.

(ii) Operation and use of radar:

(A) Purpose and adjustment of controls.

(B) Detection of malfunctions, false and indirect echoes, and other radar phenomena.

(C) Effects of sea return, weather, and other environmental conditions.

(D) Limitations of radar resulting from design factors.

(E) Safety precautions associated with use and maintenance of marine radar.

(F) Measurement of ranges and bearings, recognizing limited use of radar bearings in curving, narrow channels.

(G) Effect of size, shape, composition, and distance of vessels and terrestrial targets on echo.

(iii) Interpretation and analysis of radar information:

(A) Radar navigation (including visual techniques)—determining positions, and detecting changes in the relative motion, of other vessels.

(B) Collision-avoidance, including visual techniques, appropriate to the circumstances and the equipment in use.

(C) Applying the Navigational Rules, and other factors to consider when determining changes of course or speed of

a vessel to prevent collisions on the basis of radar observation.

(D) Use of radar in maintaining situational awareness.

(4) Radar Observer (Unlimited: Renewal). Classroom instruction—including demonstration and practical exercises using simulators—and examination, in the following subjects:

(i) Interpretation and analysis of radar information:

(A) Radar navigation (including visual techniques)—determining positions, and detecting changes in the relative motion, of other vessels.

(B) Collision-avoidance, including visual techniques, appropriate to the circumstances and the equipment in use.

(C) Determining the course and speed of another vessel.

(D) Determining the time and distance of closest point of approach of a crossing, meeting, overtaking, or overtaken vessel.

(E) Detecting changes of course or speed of another vessel after its initial course and speed have been established.

(F) Applying the Navigational Rules, and other factors to consider when determining changes of course or speed of a vessel to prevent collisions on the basis of radar observation.

(G) Use of radar in maintaining situational awareness.

(ii) Plotting (by any graphically-correct method):

(A) Principles and methods of plotting relative and true motion.

(B) Practical-plotting problems.

(5) Radar Observer (Inland Waters and GIWW: Renewal). Classroom instruction—including demonstration and practical exercises using simulators—and examination, in the interpretation and analysis of radar information, including:

(i) Radar navigation (including visual techniques)—determining positions, and detecting changes in the relative motion, of other vessels.

(ii) Collision-avoidance, including visual techniques, appropriate to the circumstances and the equipment in use.

(iii) Determining the course and speed of another vessel.

(iv) Determining the time and distance of closest point of approach of a

crossing, meeting, overtaking, or overtaken vessel.

(v) Detecting changes of course or speed of another vessel after its initial course and speed have been established.

(vi) Applying the Navigational Rules, and other factors to consider when determining changes of course or speed of a vessel to prevent collisions on the basis of radar observation.

(vii) Use of radar in maintaining situational awareness.

(6) Radar Observer (Rivers: Renewal). Classroom instruction—including demonstration and practical exercises using simulators—and examination, in the interpretation and analysis of radar information, including:

(i) Radar navigation (including visual techniques)—determining positions, and detecting changes in the relative motion, of other vessels.

(ii) Collision-avoidance, including visual techniques, appropriate to the circumstances and the equipment in use.

(iii) Applying the Navigational Rules, and other factors to consider when determining changes of course or speed of a vessel to prevent collisions on the basis of radar observation.

(iv) Use of radar in maintaining situational awareness.

[CGD 94-041, 62 FR 11303, Mar. 11, 1997]

§ 10.306 Radar-Operation course and certificate.

(a) A certificate of training from a Radar-Operation course may, as provided by 46 CFR 15.815(c)(2), suffice instead of a Radar-Observer endorsement. It is valid until the holder's license is renewed or upgraded, or expires, whichever occurs first.

(b) Each Radar-Operation course must contain at least 4 hours of instruction on the following subjects:

(1) Fundamentals of radar:

(i) How radar works.

(ii) Factors affecting the performance and accuracy of marine radar.

(iii) Purpose and functions of the main components that constitute a typical marine-radar system.

(2) Operation and use of radar:

(i) Purpose and adjustment of controls.

(ii) Detection of malfunctions, false and indirect echoes, and other radar phenomena.

(iii) Effects of sea return, weather, and other environmental conditions.

(iv) Limitations of radar resulting from design factors.

(v) Safety precautions associated with use and maintenance of marine radar.

(vi) Measurement of ranges and bearings.

(vii) Effect of size, shape, composition, and distance of vessels and terrestrial targets on echo.

(3) Interpretation and analysis of radar information:

(i) Radar navigation—determining the position and direction of movements of a vessel.

(ii) Collision-avoidance, including visual techniques, appropriate to the circumstances and the equipment in use.

(iii) Applying the Navigational Rules, Chapters 30 and 34 of Title 33 U.S. Code [Commandant Instruction M16672.2C or equivalent, as amended], and other factors to consider when determining changes of course or speed of a vessel to prevent collisions on the basis of radar observation.

(c) Each Radar-Operation course must be conducted by a person who possesses the knowledge and skills taught in the course, with at least one year of experience in their practical application, except that—

(1) A marine instructor or company official may substitute a currently valid certificate from an approved Radar-Observer course (Unlimited, or Inland Waters and GIWW) for the one year of experience; and

(2) An instructor of any approved Radar-Observer course may teach a Radar-Operation course without further seagoing experience.

(d) When a holder of the Radar-Operation certificate seeks a Radar-Observer endorsement, he or she is an applicant for an original endorsement rather than for renewal of an endorsement.

[CGD 94-041, 62 FR 11304, Mar. 11, 1997]